

A NOTE ON THE GYNOECEIUM OF CRATAEGUS AND
OF PUNICA (PUNICACEAE)

K. N. Gandhi and R. Dale Thomas, Department of Biology,
Northeast Louisiana University, Monroe, La. 71209.

In Angiosperms if the evolution of gynoecium is traced from Magnolian stock, then the suppression of the elongated receptacle (also called the gynophore or torus) could have changed the spiral arrangement of carpels to a cyclic one. This kind of reduction was necessary for the coalescence of the lateral sides of adjacent carpels during the evolution from apocarpy to syncarpy. The appearance of the hypanthium made possible the adnation of the ovary with it and resulted in the development of epigyny from hypogyny. The coalescence of the carpels might have been centripetal or centrifugal or both, but was most likely centrifugal.

The taxa of Rosaceae are known for their diversity in the nature and position of carpels, ranging from apocarpy to syncarpy and from hypogyny to epigyny. The subfamily Pomoideae includes taxa such as Crataegus, Malus and Pyrus which are characterized with inferior ovaries. In Crataegus the ovary is five-carpellary and each carpel encloses two ovules. The five styles are free and the five carpels are adnate with the hypanthium along their dorsal surfaces. The lateral surfaces of the carpels are incompletely fused and their ventral margins are free from each other. This arrangement is quite unusual in Angiosperms since the ovary is inferior but incompletely syncarpous (see Figure 1). The free inner (ventral margins of the carpels suggest that the coalescence had commenced centripetally. Although this kind of parasyncarpous nature is believed to be secondary in a few taxa such as Apocynaceae, Asclepiadaceae, Lamiaceae, etc., it is primary in Crataegus since Rosaceae contains many genera with apocarpous gynoecia.

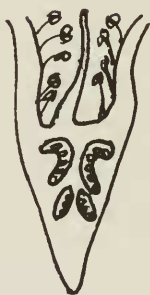
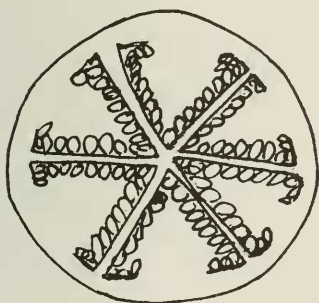
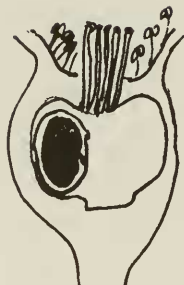
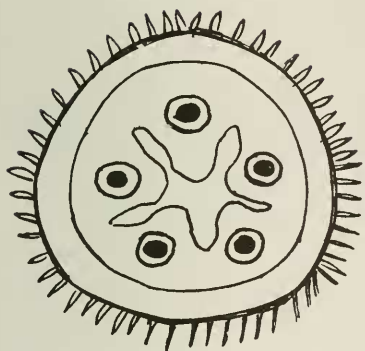


FIGURE 1. Gynoecia of Crataegus (at top) and Punica (bottom).

In Punica granatum the flower is epigynous. The gynoecium possesses many carpels that are adnate to the hypanthium. The arrangement of the carpels is quite unique. A few of the carpels are cyclic at the base with axile placentation and the remaining ones are superposed with intruding marginal placentation. Since some of the ovaries are free from each other and a few of the carpels are partly united, the number of ovaries is more than one. Thus the gynoecium has a compound ovary at the base and a few free ovaries upward.

It appears that in Crataegus and in Punica the adnation of the ovaries with the hypanthia resulting in epigyny had preceeded the development of syncarpy. This process illustrates the evolutionary concept iterated by Hutchinson and others that different organs of a plant can evolve at different rates.